

memorandum

DATE: 010 7 1 1997

REPLY TO

ATTN OF: DOE Oakland Operations Office (ESHD)

SUBJECT: Response to Secretarial Memo of August 4, 1997: Status of Known Vulnerabilities

TO: Peter N. Brush, EH-1
Acting Assistant Secretary
for Environment, Safety and Health

Victor H. Reis, DP-1
Assistant Secretary
for Defense Programs

Alvin L. Alm, EM-1
Assistant Secretary
for Environmental Management

Martha A. Krebs, ER-1
Director, Office of Energy Research

The status of known vulnerabilities is summarized by Oakland Operations Office (OAK) in the paragraphs below:

Lawrence Livermore National Laboratory (LLNL)

The status of commitments in the *Management Response Plan for the Chemical Safety Vulnerability Working Group Report* (September 1994) are summarized in the attached OAK Appraisal/Audit Validation forms.

Building 419 is undergoing Resource Conservation and Recovery Act (RCRA) closure. The only known vulnerabilities are fixed RCRA level chemical and radiological contamination. Extensive sampling and analysis are performed to characterize the contaminants and levels. This activity is covered by an Operational Safety Procedure (OSP) that was recently reviewed.

Vulnerabilities related to deactivation, closure, or operational changes are assessed in accordance with DOE Order 5480.21, *Unreviewed Safety Questions*, as implemented by the Health & Safety Manual Supplement 2.21, *Implementation Guide for the Unresolved Safety Question Process*.

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1/8/98

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Lawrence Berkeley National Laboratory (LBNL)

LBNL is currently preparing their report titled *Chemical Vulnerability of Facilities in Transition*. It discusses chemical and radiological vulnerabilities at facilities and operations either shut down or undergoing change-over to another mode of operation.

They have identified two primary areas of potential vulnerability, and several minor areas. The two primary areas are:

1. PIT Room. (A storage room of legacy radioactive materials.) The potential hazards include radioactive contamination, radiation exposure, organic solvents, acids, confined space, lead, asbestos, and unknowns.
2. Old Hazardous Waste Handling Facility (recently vacated; replaced by a new facility). The potential hazards include radioactive contamination, chemical contamination (acids, bases, organic solvents), asbestos, and lead.

The two primary areas currently have projects underway to address the vulnerabilities.

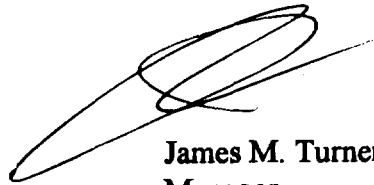
Energy Technology Engineering Center (ETEC)

Vulnerabilities from and controls for stored sodium metal, stored ethanol and ammonia used in the Kalina Demonstration Facility and deactivation and demolition activities and waste are discussed in Attachment 2.

DEC 2 1997

Stanford Linear Accelerator Center (SLAC)

No chemical vulnerabilities associated with facilities that are shutdown, in standby, being deactivated or have changed their mission are known.

A handwritten signature in black ink, appearing to read 'James M. Turner', is written over a horizontal line.

**James M. Turner, Ph.D.
Manager**

- Attachments:** (1) Status of Known
Chemical Vulnerabilities
At LLNL
- (2) Fax from Phil Boehme to
Ev Valle, EM/EPD
dated 12/1/97

Attachment 1

Status of Known Chemical Vulnerabilities at LLNL

**APPENDIX A
VALIDATION FORM**

Listed below is a description of a corrective activity, and its corresponding appraisal, audit, assessment, inspection, walk-through, or surveillance which has been declared complete by the responsible organization. The completed form shall be returned to the LSO.

Activity Description:

CSRV-LLNL-EP-01 Emergency Plan Implementing Procedures (EPIPS) for integrated LLNL response to a site wide hazardous materials emergency will be approved and issued by September 30, 1994

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: XXX (Describe below the basis for closure, e.g. files, procedures, facilities inspected)

A phone call to Allen Remick and his return phone message indicated that he had seen the completed EPIPS and it was dated December 29, 1994.

No: (Explain and provide recommendation below to achieve closure)

Reviewer: Harvey Grasso Date: 7/30/97

Division: ESHD Phone No.: 637-1610

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Listed below is a description of a corrective activity, and its corresponding appraisal, audit, assessment, inspection, walk-through, or surveillance which has been declared complete by the responsible organization. The completed form shall be returned to the LSO.

Activity Description:

CSRV-LLNL-FM-01.1 All LLNL facilities have determined the applicability of HS&M Supplement 2.3 (DOE 5820.2A)

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: XXX*

I saw Ron Cochran letter to Assoc. Directors notifying them of the requirement to do D&D Management Plans for radioactively contaminated facilities and requesting that they be provided by 8/12/97. I also saw the collection of plans that were submitted. Submitted plans also delineated chemical contamination.

I did not attempt to whether there were plans for all chemically contaminated facilities.

*** This should be referred to the Facility Reps. who have specific knowledge about buildings for verification that all chemically and radioactively contaminated facilities have been evaluated and D&D Management Plans prepared.**

Reviewer: Harvey Grasso Date: 10/09/97

Division: ESHD Phone No.: 637-1610

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Activity Description:

CSRV-LLNL-FM-01.2 All LLNL facilities for which HS&M Supplement 2.03 is applicable have developed D&D Management Plans

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: XXX*

I also saw the collection of plans that were submitted. Submitted plans also delineated chemical contamination.

I did not attempt to whether there were plans for all chemically contaminated facilities.

*** This should be referred to the Facility Reps. who have specific knowledge about buildings for verification that all chemically and radioactively contaminated facilities have been evaluated and D&D Management Plans prepared.**

*** There remains an issue regarding the maintenance of D&D Management Plans. The plans I saw were prepared as part of a one time effort and because of funding cuts they have not been updated since**

Reviewer: Harvey Grasso Date: 10/09/97

Division: ESHD Phone No.: 637-1610

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Activity Description:

CSRV-LLNL-MO-01 Hazards analysis program lacks adequate guidance for effective implementation

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: ~~XXX~~ Describe below the basis for closure, e.g. files, procedures, facilities inspected)

I reviewed and discussed with Pam Poco the latest version of the Project Work Plan (Rev. 3.0) and guidance for its use provided in the Facility Safety Procedure for Building 151 and found them adequate.

No: (Explain and provide recommendation below to achieve closure)

Reviewer: Harvey Grasso Date: 7/30/97

Division: ESHD Phone No.: 637-1610

Close-out Procedure - Rev. 0(5/97)

CSRV-LLNL-MO-01

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Activity Description:

CSV-LLNL-MT-01.1

Revise curricula of Pressure Safety (HS-5030) and Chemical Safety (HS-4240) to include information on personal protective equipment for use with cryogens.

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: (Describe below the basis for closure, e.g. files, procedures, facilities inspected)

No: XXX (Explain and provide recommendation below to achieve closure)

I reviewed training courses HS-5030 and HS-4240 for content on cryogenic hazards. HS-5030 contains a discussion of cryogenic hazards that is adequate but HS-4240 (web based training) does not discuss a cryogenic hazards discussion. I need to see the modified HS-4240.

This was discussed with Pam Poco, George Fulton and Rex Beach on 9/9/97 who agreed to follow up on the issue of cryogenic information in HS-4240.

Reviewer: Harvey Grasso Date: 9/09/97

Division: ESHD Phone No.: 637-1610

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Activity Description:

CSVR-LLNL-MT-01.2

Cirroculi of the New Employee Safety Orientation (HS-0001) modified to cover Health hazard Communication issues.

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: **XXX** (Describe below the basis for closure, e.g. files, procedures, facilities inspected)

Reviewed curriculum of HS-0001 for content covering Hazard Communication and found it adequate.

No: (Explain and provide recommendation below to achieve closure)

Reviewer: **Harvey Grasso** Date: **07/30/97**

Division: **ESHD** Phone No.: **637-1610**

Close-out Procedure - Rev. 0(5/97)

CSVR-LLNL-MT-01.2

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Activity Description:

CSV-LLNL-MT-01.3 Workplace hazard identification and notification for custodians, protective forces, emergency response and other personnel completed.

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: **XXX** (Describe below the basis for closure, e.g. files, procedures, facilities inspected)

I reviewed the FSP for Building 151 and visited LLNL facilities. The FSP identifies the hazards in the facility and room door placards identify the special hazards inside of them. Facility managers and room responsible persons also function as hazard communicators as a primary point of contact for visitors and by orienting new employees and visitors.

No: (Explain and provide recommendation below to achieve closure)

Reviewer: **Harvey Grasso** Date: **7/30/97**

Division: **ESHD** Phone No.: **637-1610**

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Activity Description:

CSVR-LLNL-MT-01.4 Employees requiring chemical safety classes (HS-4240) and/or Laboratory Safety (HS-4246) have taken appropriate courses.

Appraisal/Audit:

Chemical Vulnerability Study Response Plan (September 1994)

Is this finding and/or activity validated?

Yes: XXX

CMS has made the determination that janitor training will consist of HS-0001 and facility orientations by the facility manager. Only lab users will get HS-4240 and other hazard specific training delineated in FSP's and OSP's.

Reviewer: Harvey Grasso Date: 9/9/97

Division: ESHD Phone No.: 637-1610

Close-out Procedure - Rev. 0(5/97)

CSVR-LLNL-MT-01.4

Boeing North American, Inc.
Rocketdyne Division
Energy Technology Engineering Center
Boeing Defense & Space Group
P.O. Box 7930
Canoga Park, CA 91309-7930

October 1, 1997

In reply refer to 97ETEC-DRF-97-0373

James M. Turner, Ph. D.
Manager, Oakland Operations Office
US Department of Energy
1301 Clay Street
Oakland, CA 94612-5208

BOEING

Subject: Management of Chemical Hazards

Reference: 1) Letter, James M. Turner, Ph.D. to Mark Gabler, same subject,
dated August 18, 1997 (97ETEC-DRF-0291)
2) Letter, W. S. De Bear to Hannibal Joma, "Chemical Explosion at
Hanford", dated June 18, 1997 (97ETEC-DRF-0184)

Dear Dr. Turner:

Reference 1 transmitted the Accident Investigation Board Report on the May 14, 1997 explosion in the Hanford Plutonium Reclamation Facility, and directed that all DOE field elements and site contractors assess their management of chemical and radiological hazards. Reference 2, prepared following ETEC's review of the May 22, 1997 Safety Alert concerning this accident, provided a partial response prior to the present request and concluded that no similar circumstance, with potential for significant energy or toxic material release, currently exists at ETEC. However, in light of this more thorough present review, one circumstance, i.e., the interim storage of sodium-wetted components pending cleaning, was identified as having the potential for hydrogen generation and container overpressurization. Although these containers routinely are monitored for any sign of bulging or deterioration, breather valves are on order and will be installed to preclude any possibility of significant pressure buildup. Additional discussion in this area, and ETEC's responses to the other concerns requiring assessment, are provided in the attachment.

To: Ev Valle
EM/EPD

From: Phil Boehme

Subject: New Chemical Vulnerability Note

Date: December 1, 1997

References: (a) Your fax, no subject, dated 12/1/97 at Oakland, CA.

(b) Memo by Milton D. Johnson, "Request for Information", dated November 26, 1997 at DOE/HQ.

(c.) Memo by M.J. Gabler, "Management of Chemical Hazards", dated October 1, 1997 at ETEC.

This fax is a response to your request (Reference (a)). This is not an Energy Research facility as specified in Reference (b) -- this reply describes only an EM facility, ETEC. Some of the materials described in the attachment (Reference (c)) are not wastes, but they are included at your request. They are materials that could cause a chemical reaction resulting in an explosion.

Sincerely,



Philip R. Boehme

Please contact me, or W. S. De Bear at (818)586-5942, if there are questions or further discussion is required on any of the assessment items.

Very truly yours,

A handwritten signature in black ink, appearing to read 'M. J. Gabler', is written over the typed name.

M. J. Gabler, Director and Program Manager
Energy Technology Engineering Center

cc: P. Boehme, ESO
H. Joma, Manager, ESO

Attachment to 97ETEC-DRF-97-0373

1. Use, storage, and disposal of any chemicals with potential for explosion, fire, or significant toxic release:

The chemicals that are, or have been, present at ETEC in sufficient quantity to represent potential threats of the types listed above are ammonia, sodium, and ethanol.

Ammonia (both anhydrous and aqueous):

Ammonia, which is classified as an extremely hazardous material, was present, in quantity, during operation of the Kalina Demonstration Plant. Following Kalina shutdown, in October, 1996, all ammonia was removed. Consequently, there is no present potential for a release and there are no current plans for restoring the ammonia inventory or resumption of operation.

Sodium:

ETEC's two largest test facilities, i.e., the Sodium Pump Test Facility (SPTF) and the Steam Generator Test Facility (SCTI), each contain over 30,000 gallons of sodium. The Liquid Metal Development Laboratory-2 (LMDL-2) contains two small test rigs which, together, contain approximately 100 gallons of sodium. The two large facilities currently are inactive, with solidified sodium in the storage tanks, under a positive pressure, inert gas cover. The probability of a sodium leak or fire under these conditions is essentially zero.

One of the test rigs in LMDL-2 is being activated for a short-term test program and will operate at low pressure with a sodium temperature of 1200F. Although the probability of a leak is higher than in the inactive facilities, it remains very low and, considering that the quantity of sodium involved is less than fifty (50) gallons, the worst case scenario would not result in a significant off-site consequence.

SPTF is scheduled to resume operation in CY 1999 to test a large electromagnetic pump. At that time the sodium system will be heated and filled, and sodium circulation will be resumed. Maximum pressure and temperature, respectively, will be 50 psig and 1000F. Based on extensive experience with large sodium facilities operating under similar conditions, sodium leaks are possible; however, most would be small (through intergranular cracks caused by stress corrosion) and would not pose an off-site hazard. (The largest sodium leak ever experienced at SPTF occurred at an average rate of less than one gpm, involved less than 50 gallons of sodium, and did not have any appreciable impact at the site boundary.) Further, to minimize the probability of a leak during testing, a comprehensive inspection of susceptible piping and instrumentation locations will be performed prior to startup to verify pressure boundary integrity. The facility also has emergency drain capability to terminate leakage by lowering sodium level below the leak location, and an installed dry powder distribution system for suppression of external sodium reactions.

SCTI is scheduled for demolition starting in CY 1998 and most of its sodium inventory will be off-loaded and shipped for reuse. Off-loading will necessitate heating drain tanks and interconnecting piping to slightly above the melting point of sodium (208F). The tanks will then be slightly pressurized to transfer the inventory to DOT-approved isotankers. Transferred sodium then will be cooled and solidified before the isotankers are permitted to move on-site (some of the sodium will be used to increase the inventory at SPTF) or to leave the SSFL site. The potential for significant leakage or off-site impacts during these processes is considered negligible.

Bulk sodium from ETEC's other sodium facilities, which currently are undergoing demolition, has already been removed and shipped off-site for reuse. A small amount of residual sodium remains in piping segments and removed components pending its conversion to sodium hydroxide and reuse as product. This conversion is being done, predominantly, using a Water Vapor/Nitrogen (WVN) process which results in a slow, controlled reaction and produces usable, high concentration caustic. The WVN process does result in the production of hydrogen. Hydrogen concentration within the WVN system (in nitrogen with essentially 0% oxygen) is closely monitored and normally is between 1 and 2%; however, during occasional excursions, it briefly, can exceed 20%. For this reason, the effluent gas is continuously diluted such that the hydrogen concentration in air always is maintained well below the lower explosive limit (LEL) of 4%. A small fraction of the residual sodium, in components which are not suitable for cleaning by WVN, will be treated at ETEC's Hazardous Waste Management Facility (HWMF). HWMF is a Permitted facility, with limited treatment capability and numerous safeguards to preclude any significant on-site or off-site consequences. Both of these treatment options are considered to be safe and effective; however, a potential concern does exist during storage of sodium-wetted components pending treatment. Although many of the components have had closures welded over their cut ends to prevent entry of moisture, in some cases welded closures are not possible. These components are stored, indoors, in drums or boxes which, though sealed, conceivably could permit the incursion of moisture and subsequent pressurization from the generation of hydrogen. To alleviate this concern, all such drums and boxes are visually monitored for any sign of bulging, damage or deterioration and their conditions, and any pertinent observations, are logged at least once per week. As an added precaution, breather valves have been ordered and will be installed when received. These valves will open to relieve pressure should internal pressure exceed atmospheric pressure by 0.5 psi.

(The breather valves were ordered and installed - 12/97 PRB.)

In summary, none of the operations at ETEC involving sodium, sodium conversion, or the removal and transport of metallic sodium or sodium hydroxide is considered to pose any threat of the types listed above.

Ethanol:

Denatured ethanol is used at the Component Handling and Cleaning Facility (CHCF) as a cleaning agent to slowly react and remove metallic sodium from large, sodium-wetted components such as steam generators and the pumps tested in SPTF. The storage tank(s) at CHCF normally hold approximately 20,000 gallons of ethanol.

These tanks recently were emptied of previously used ethanol to permit removal of residual sodium alcoholate reaction products but will be refilled to support future cleaning needs. The fire potential of this large quantity of ethanol is mitigated by the use of an inert (nitrogen) cover gas and by a water deluge system that provides complete coverage for the storage tanks. As an additional precaution, fire department personnel, with fire-suppression foaming equipment, are on stand-by at the site whenever ethanol transfers or cleaning operations are initiated. Berms are provided around the ethanol system to retain any leakage and maximize the effectiveness of the foaming equipment or deluge system, and the bermed areas are drained to a large overflow retention basin to prevent contamination of other on-site water retention ponds.

Radiological Considerations:

Potential radiological vulnerabilities are associated with: 1) stored TRU waste pending disposition by DOE, 2) radiological releases during Demolition & Decontamination (D&D), 3) Radioactive Materials Handling Facility (RMHF) water management operations, and 4) shipment of radioactive (RA) waste to off-site disposal facilities. Normal safeguards include: a highly trained staff, on-site fire protection personnel and facility fire protection systems, the absence of any significant source of combustion or explosion, and the performance of all operations to approved, written procedures which include all appropriate safety provisions.

All TRU waste is stored at RMHF in HEPA-filtered, below-grade, shielded vaults for ALARA and SNM control purposes. TRU waste packaged in final form for disposal incorporates vents in the container lids to preclude buildup of any gas pressure. Waste, pending final form packaging, is packaged to ensure full containment while allowing for release of any gases even though none of the waste (non-pyrophoric metallic debris from hot cell drain lines) contains any significant source of gas generation.

All D&D activities at facilities involving radioactivity are performed under the strict surveillance of Rocketdyne health physicists. Radiological risks at facilities currently undergoing D&D are extremely low due to the very low levels of radioactivity being handled. D&D is limited, almost exclusively, to basic construction materials (concrete, steel, sheet metal). No pyrophoric and almost no flammable materials are being handled.

The RMHF handles moderate amounts of radioactive waste water (<10,000 gal. total capacity) which is evaporated. The remaining sludge is solidified and packaged for disposal. Activity levels in both water and sludge are low and easily managed. The evaporator water handling system utilizes double containment throughout and no sources of ignition or combustible materials are present.

All RA waste shipped off-site for disposal conforms to Department of Transportation (DOT) 49CFR regulations and DOE approved disposal site packaging criteria. 49CFR stipulates packaging requirements appropriate to the level of hazard associated with each category of radioactive material. Rocketdyne makes all

shipments of RA waste, except "limited quantity" shipments, under 49CFR "exclusive use" provisions. All RA waste currently being disposed of is in low hazard categories (Low Specific Activity, Surface Contaminated Objects, Limited Quantities). Shipments in these categories are made in DOT "strong tight containers" as stipulated by 49CFR. The largest quantity of waste shipped (contaminated soil) contains RA levels below that regulated by DOT. However, the soil is shipped in DOT "strong tight containers" and under the direction of DOE is disposed of as RA waste at DOE approved disposal sites since it does contain detectable quantities of "DOE added RA material." A few shipments during the past year have included small quantities of waste requiring Type A packages (Radioactive Material NOS). In all cases, packages and accompanying documentation have been reviewed and verified to be free of incompatible wastes.

Future shipments of TRU waste to WTPP will utilize the TRUPACK II packaging system which was specifically designed by DOE and approved by NRC for the shipment and protection of TRU material and takes into account all credible accident scenarios.

2. The management and resolution of previously identified chemical and radiological vulnerabilities at facilities that are shut down, in standby, being deactivated, or have changed their conventional modes of operation in the last several years:

Responses pertinent to this section are contained in the discussion under item 1.

3. Programs to assess facility and operational vulnerabilities on a continuing basis:

ETEC has in-place a number of programs designed to assess (and correct) facility and operational vulnerabilities. The first of these, used at the start of new programs and operations, is a "Won't Fail" evaluation performed by a panel consisting of all affected disciplines. Alternative approaches for 'design' of the facility, test, or operation, are suggested and evaluated with respect to vulnerabilities and the probability of first-time-through success. After consensus is reached on the most promising approach, the panel then attempts to identify and rectify any residual weaknesses that could lead to failure. Prior to the start of operation of a new or modified facility or new test program, a Readiness Review is held to verify that construction is complete, that there are no outstanding nonconformances, appropriate procedures are in place, training of operating personnel is comprehensive and completed, and all other requirements have been met. Both "Won't Fail" and Readiness Review processes are documented.

In addition to the above, ETEC uses the DOE Occurrence Reporting (OR) system to document problems and to identify root cause and corrective actions to prevent recurrence. The DOE OR is supplemented by an internal Corrective Action Report (CAR) which is reviewed by ETEC's Corrective Action Board (CAB) consisting of the ETEC Director and Program Manager and all direct reports, with the added participation of experts from other affected organizations. Significant events, and those with generic implications are referred to the higher level Advanced Programs CAB and, if appropriate, to the Rocketdyne Senior Management Review Board.

4. The training and technical competence of staffs to identify the full range of hazards presented by facilities, act on results and implement training programs where needed:

All facility and support personnel are trained appropriate to their assignments. Operating personnel receive extensive, universally applicable training, e.g., Lockout/Tagout, Confined Space Entry, Lifting and Handling, Fall Protection, MSDS Awareness, etc. All persons whose assignments entail work with liquid metals, radioactivity, or specific hazardous materials (e.g., lead and asbestos) receive appropriate training on handling and safety practices. Selected personnel receive even more specialized training on handling of hazardous waste (HAZWOPER) and packaging and shipping of hazardous and RA wastes (49CFR). Most training is presented by qualified Rocketdyne instructors from SHEA, Technical and Skills Development, Quality Assurance, and Fire Protection; however, commercial training organizations (and sometimes regulatory agency experts) are utilized when necessary to obtain more comprehensive, up to date instruction.

5. The completeness and accuracy of Lessons Learned and Occurrence Reporting program efforts, the timeliness of information distribution, and appropriate action and tracking:

ETEC makes use of multiple systems to report and evaluate internal problems and disseminate lessons learned. These include not only the formal DOE OR and Rocketdyne's multi-level CAB processes, but also daily tailgate meetings, safety and lessons-learned presentations at weekly staff meetings, and ad hoc "all-hands" meetings to review events of particular significance. The "all-hands" meetings are intended - and have proven successful - not only as forums to convey information but to obtain enthusiastic participation and constructive input from all levels of the organization.

Both formal reporting systems (DOE OR and Rocketdyne CAR) include mechanisms for tracking the timeliness of responses and corrective actions. In a number of instances ETEC responses have not met established submittal criteria; however, whenever a personal health or safety, or an environmental issue has been involved, immediate corrective action has been taken or a stand-down condition has been maintained pending completion of corrective actions.

Other sources of information are used to learn of, and disseminate in timely fashion, applicable lessons-learned from problems experienced elsewhere. The Operating Experience Weekly Summaries issued by the DOE Office of Nuclear and Facility Safety, and Safety Alerts are widely reviewed for applicable information which then is passed along to, and discussed, with affected personnel. (ETEC prepared the earlier vulnerability assessment of reference 2 based on the Safety Alert issued following the Hanford explosion.) Internally, a separate Santa Susana Field Laboratory (SSFL) Corrective Action Board has been established to assure that the root causes and corrective actions for problems experienced by all field laboratory organizations are adequately conveyed. Also, SSFL has a Joint Employee-Management Safety (JEMS) Committee which meets regularly to discuss safety

issues, identify areas needing attention, and follow-up on corrective actions. The JEMS Committee publishes a regular newsletter to heighten employee awareness of potential safety problems and promote world-class safety behavior. Finally, Rocketdyne has adopted, and is actively utilizing, DuPont's " Safety Training Observation Program" (STOP) to record and report safety-related observations across the division, providing a mechanism for the identification and correction of safety issues.